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# **LAMINATED ROOFING SHINGLE HAVING STAGGERED SHADOW LINES AND METHOD OF MAKING THE SAME**

## **TECHNICAL FIELD AND INDUSTRIAL APPLICABILITY OF THE INVENTION**

This invention relates to roofing shingles and a method of making roofing shingles. More particularly, the invention relates to laminated roofing shingles having staggered shadow lines and a method of making such shingles. The staggered shadow lines enhance the three dimensional appearance of a roof surface bearing laminated shingles.

## **BACKGROUND OF THE INVENTION**

Asphalt or composite shingles are one of the most commonly used roofing products. Asphalt shingles generally include a base material made from organic felt or a fiberglass mat. The base material serves as a matrix to support an asphalt coating and gives the shingle strength. The asphalt coating is formulated for the particular service application. The asphalt coating has a long-term ability to resist weathering and provides stability under extreme temperature conditions. An outer layer of granules is applied to the asphalt coating to form an outer surface, which shields the asphalt coating from direct sunlight. The granules also offer resistance to fire. When manufacturing colored shingles, colored granules may be applied to the asphalt coating.

Although asphalt shingles offer significant advantages over wood shingles with respect to cost, service life, and fire-resistance, wood shingles are often preferred because of the pleasing aesthetic appearance of the wood shingle roof. An important aesthetic advantage of the wood shingle as compared to an asphalt shingle is attributed to the thickness of the wood shingle. The thickness of wood shingles produces a finished roof having a layered look with depth.

Various asphalt shingles attempt to provide an appearance of thickness comparable to that of wood shingles. Examples of such asphalt shingles are shown in U.S. Pat. No. 5,666,776, issued to Casimir Paul Weaver et al., U.S. Pat. Des. No. 379,672, issued to Glenn D. Lamb et al., and U.S. Pat. Des. No. 340,294 and U.S. Pat. Des. No. 375,563, both issued to Marcia G. Hannah et al. The Weaver et al. patent shows a laminated asphalt roofing shingle having color gradations from light to dark. The color gradations create the illusion of depth or thickness. The Lamb et al. patent shows a double-shadow shingle design comprising six generally rectangular areas of different shading with alternate shaded areas having a wide darker area or shadow line at the top and a narrow shadow line at the bottom. The Hannah et al. patents show a staggered shadow line. Some of the shadow lines are heavily shaded and some of the shadow lines are lightly shaded.

## **SUMMARY OF THE INVENTION**

The present invention is a laminated roofing shingle having staggered shadow lines. The shingle comprises an underlay and an overlay attached to an underside of the overlay. The overlay has a plurality of spaced-apart tabs. An opening is defined between each one of the tabs. Portions of the underlay are exposed through the openings between the tabs. A layer of granules is disposed on the tabs and the

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underlay. The layer of granules on the lower portion of the overlay are substantially darker in color than the granules the remainder of the tabs. Similarly, a layer of granules is disposed on the underlay. The layer of granules on the upper portion of the underlay is substantially darker in color than the remainder of granules on the underlay.

In accordance with a method of the present invention for making laminated shingles, a base material is coated with asphalt. The top surface of the base material is coated with a layer of granules to provide a lighter central layer of granules and two spaced-apart layers of granules that are substantially uniform in color and darker in color than the central layer of granules. The base material is cut into two horizontal lengths or lanes. The width of each lane corresponds to the desired width of the overlay. The cut corresponds with the desired pattern for the tabs and the associated openings to produce two side-by-side overlays, each being complementary to the other. The cut is made such that the lower portions of the tabs carry the darker layer of granules. The lanes may then be cut laterally to correspond to the desired length of the overlay. An underlay may be produced in a similar manner, having its surface coated with a layer of granules to provide a lighter layer of granules on a prominent portion of its surface and a darker layer of granules along an upper minority portion of the underlay. The underlay is attached to the underside of the overlay to produce a laminated shingle having a substantially rectangular configuration. Portions of the underlay are exposed through the openings between the tabs with darker granules exposed through an upper portion of the openings.

Various objects and advantages of this invention will become apparent to those skilled in the art from the following detailed description of the preferred embodiment, when read in light of the accompanying drawings.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a front view of a laminated shingle of the invention.

FIG. 2 is a front view of an overlay of the laminated shingle shown in FIG. 1.

FIG. 3 is a front view of an underlay of the laminated shingle shown in FIG. 1.

FIG. 4 is a cross-section of the laminated shingle shown in FIG. 1, taken along lines 4—4.

FIG. 5 is a perspective view of a plurality of overlapping laminated shingles.

FIG. 6 is a perspective view of a base material being cut into two horizontal lengths wherein the cut corresponds with the desired pattern for the tabs and the associated openings to produce two side-by-side overlays, each being complementary to the other.

FIG. 7 is a flow chart of a method of making a laminated shingle according to the invention.

## **DETAILED DESCRIPTION AND PREFERRED EMBODIMENTS OF THE INVENTION**

The description and drawings disclose laminated roofing shingles comprised of a base material and composite materials. It is to be understood that the base material can be any suitable support material. Common base materials include

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organic felt and fiberglass mat. It is also to be understood that the composite materials may be any suitable combination of materials. The composite materials are preferably low in cost, have a long service life, and are fire-resistant. Common composite materials include asphalt coating and mineral granules.

As shown in FIGS. 1 through 4, a laminated shingle 10 according to the invention comprises an overlay 12 and an underlay 14. The overlay 12 and underlay 14 cooperate with each other to provide a headlap section 16 and a butt section 18. The overlay 12 has a generally rectangular configuration comprising a headlap section 16. A plurality of tabs 20a, 20b, 20c extend from the headlap section 16 to partially form the butt section 18. Depending on the desired application and appearance of the shingles 10, the tabs 20a, 20b, 20c may have equal widths or different widths, such as the different widths W1, W2 shown in FIG. 2. Moreover, the tabs 20a, 20b, 20c may have a square, rectangular, trapezoidal or other geometric configuration. A plurality of openings 22a, 22b, 22c are formed between the tabs 20a, 20b, 20c. The underlay 14 also has a generally rectangular configuration. The underlay 14 is disposed beneath the overlay 12 and attached to an underside 23 of the overlay 12 with a portion of the underlay 14 exposed through the openings 22a, 22b, 22c adjacent the tabs 20a, 20b, 20c.

Various techniques may be used to attach the underlay 14 to the underside of the overlay 12. Typically, a laminating adhesive is used. The overlay and underlay 12 and 14 cooperate to form a resulting laminated shingle 10. This is accomplished by aligning a leading edge 24a of the tabs 20a, 20b, 20c with a leading edge 24b of the underlay 14. The resulting laminated shingle 10 is generally rectangular in configuration. The rectangular configuration of the laminated shingle 10 is defined in part by two spaced-apart longitudinal edges 24, 26 and two spaced-apart lateral edges 28, 30 extending between the longitudinal edges 24, 26. One of the longitudinal edges 24 defines a lower edge or leading edge of the laminated shingle 10, and is cooperatively defined by the leading edge 24a of the tabs 20a, 20b, 20c and the leading edge 24b of the underlay 14. A plurality of self-sealing adhesive stripes 32 are preferably disposed on the outer surface of the overlay 12 in the lower part of the headlap section 16.

In accordance with the preferred embodiment, a fiberglass mat (not shown) is provided as a base material for making the laminated shingle. During manufacture, an asphalt coating is applied to both sides of the fiberglass mat. An undersurface of the laminated shingle 10 may be coated with various inert materials with sufficient consistency to seal the asphalt coating and thus provide a non-tacky undersurface. The exposed outer surface of the laminated shingle, generally indicated in FIG. 1 at 34, is defined by the outer surface 34a of the tabs 20a, 20b, 20c and the portions of the outer surface 34b of the underlay 14 that are exposed through the openings 22a, 22b, 22c adjacent tabs 20a, 20b, 20c. The outer surface 34 of the laminated shingle 10 may be coated with various types of granules 36 to protect the asphalt coating and provide a fire resistant surface. The headlap section 16 of the laminated shingle 10 is generally coated with an inexpensive layer of granules. The butt section 18 of the laminated shingle 10 may be coated with a layer of

colored granules to add color to the laminated shingle 10. It should be understood that granules may be of different types and characteristics, to yield different shading, sizing, and/or color arrangements.

An important feature of the laminated shingle 10 according to the present invention includes providing staggered shadow lines or darker granule zones 38, 40 on the outer surface 34 of the laminated shingle 10, as shown in FIG. 1. A first shadow line 38 is provided on the outer surface 34a of the tabs 20a, 20b, 20c, and a second shadow line 40 is provided on the outer surface 34b of the underlay 14. The first shadow line 38 starts at the leading edge 24a of the tabs 20a, 20b, 20c and covers a minority of the outer surface 34a of the tabs 20a, 20b, 20c. A remaining portion, or the majority of the outer surface 34a, of the tabs 20a, 20b, 20c, generally indicated in FIG. 1 at 42, is located between the first shadow line 38 and a trailing edge 62 of the tabs 20a, 20b, 20c. The trailing edge 62 of the tabs 20a, 20b, 20c is located along a side of the remaining portion 42 of the tabs 20a, 20b, 20c opposite the leading edge 24a of the tabs 20a, 20b, 20c and abuts portions of the leading edge 47 of the headlap section 16. The remaining portion 42 is substantially lighter in color than the first shadow line 38. The second shadow line 40 starts at the trailing edge 44 of the underlay 14 and covers a minority of the outer surface 34b of the underlay 14. A remaining portion, or the majority of the outer surface 34b, of the underlay, generally indicated at 46, is located between the leading edge 24b of the underlay 14 and a trailing edge 44 of the underlay 14. The remaining portion 46 is substantially lighter in color than the second shadow line 40. The remaining portions 42, 46 preferably comprise 80-92 percent of their respective outer surfaces 34a, 34b. Portions of the outer surface 34b of the underlay 14 are exposed through the openings 22a, 22b, 22c adjacent tabs 20a, 20b, 20c with the second shadow line 40 disposed adjacent a leading edge 47 of the headlap section 16. The first shadow line 38 on the leading edge 24a of the overlay 12 and the second shadow line 40 on the trailing edge 44 of the underlay 14 provide staggered shadow lines 38, 40. The darker granules forming the shadow lines 38, 40 of the laminated shingle 10 are seen in marked contrast to the lighter granules on the remaining portions 42, 46 of the laminated shingles 10. The granules forming the shadow lines 38, 40 are preferably fine black granules.

As illustrated in FIG. 5, a plurality of laminated shingles 10 may be installed on the surface of a roof or other structure (not shown) to provide protection for the surface against the weather and provide an aesthetically appealing appearance for the surface. A normal procedure for installing the laminated shingles 10 includes placing the shingles on the surface of the roof in an overlapping configuration. Typically, the butt section 18 of one laminated shingle 10 will be disposed in an overlapping manner on the headlap section 16 of laminated shingles of the lower or previously laid course of shingles. Stripes 32 of tab sealant material are used to secure the overlapping laminated shingles 10 to each other.

A method for making laminated shingles 10 of the invention is best understood with reference to FIGS. 6 and 7. The method comprises the step 110 of providing a base material, such as shingle mat (not shown). Although various types of shingle mat may be provided, a fiberglass mat is preferred.